

KMS Protoype using Stohmaier Framework at Association of Indonesian Kindergarten Teachers in South Bangka Regency

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Abstract— IGTKI is a kindergarten teacher association organization that aims to realize the quality of early childhood education with a spirit of professional love and character to be able to face the era of globalization. However, this goal is not fully implemented because of the distance of each school is far, the results of the training are not socialized, the lack of knowledge to handle students with special needs so that the lack of knowledge sharing among PAUD teachers. To increase the knowledge sharing needed a Knowledge Management System application that can be a solution of knowledge sharing that is not hindered by the limitations of time and place. This study uses the Strohmaier Framework for modeling knowledge management systems. Techniques of Analysis and system design are carried out using the object oriented approach method Unified Manipulation Language (UML). The suitability of the system to the business process was tested using the Forum Group Discussion (FGD) method which was validated using the Fit criteria from Strohmaier's theory which produced a value of 76%, this value shows that the Knowledge Infrastructure designed is in accordance with the business process. Meanwhile, user acceptance of the system was tested using User Acceptance Testing (UAT) in the form of a questionnaire which was calculated based on the Linkert scale, producing a value of 84%. From this value it can be concluded that the level of user acceptance at IGTKI is good for the KMS created. **Keywords**— *Knowledge Management System, Framework Strohmaier, Knowledge Sharing, IGTKI*

I. INTRODUCTION

Early childhood education is all efforts and actions taken by educators and parents in the process of caring for, nurturing and educating children by creating an aura and environment where children can explore experiences that provide them with the opportunity to know and understand learning experiences obtained from the environment. In relation to the term of educator in Early Childhood Education, based on Law Number 20 Article 40 Paragraph 2, it is stated that the obligations of educators are: (1) to create a meaningful, enjoyable, creative, dynamic and dialogical educational atmosphere; (2) to have a professional commitment to improving the quality of education; and (3) to provide examples and maintain the good name of the institution, profession and position in accordance with the trust given to them [1]. In order to carry out these obligations, educators must have a number of competencies. Competencies

as learning agents in Early Childhood Education include: pedagogical competence, personality competence, professional competence, and social competence (Government Regulation no. 19 of 2005: National Education Standards Chapter VI).

IGTKI South Bangka Regency is an organization of Kindergarten teachers in South Bangka Regency. IGTKI is an independent organization that aims to improve the quality of Early Childhood Education assigned to PAUD teachers. To improve the competence of educators or PAUD teachers in South Bangka Regency, teachers are assigned to attend training conducted by the Education Office or other training institutions. IGTKI South Bangka also holds meetings every two months to discuss the implementation and problems in Early Childhood Education in the South Bangka Regency environment and to socialize the results of the training. Every teacher who participates in training is required to make a report on the results of the training provided by the training institution and share the knowledge gained with teachers who do not receive training. Only 10% of the 260 IGTKI South Bangka teachers often make reports on the results of the training.

The training report is only stored in the IGTKI South Bangka Regency secretariat. With the number of kindergartens as many as 53 schools in 8 sub-districts in South Bangka Regency, and not all teachers who participate in training share and socialize the knowledge gained from the training, making reports and knowledge gained from the training is not distributed as it should be. In addition, each teacher has their own way or method in stimulating, guiding, and providing learning activities to produce children's abilities and skills. Realizing this, based on (Permenpan, 2011). every government institution must be ready to utilize the wealth of knowledge, including learning from past experiences. In general, this is manifested in the form of rules and procedures in the organization. The obstacles often faced are that teachers' knowledge and experience are often not distributed, not well documented and may still be in the heads of each teacher.

Knowledge Management is an effort to improve an organization's ability to manage their intellectual assets, knowledge and experience. The aim is to utilize assets to achieve better organizational performance to accelerate the achievement of reform goals efficiently (Permenpan, 2011).

In research conducted by (Dewi Driyani and Dewi Mustari, 2015) regarding Web-based Learning Models for Kindergarten using the SECI method to produce a teaching and learning process system to help students get learning information and make it easier for teachers to share learning material information. The research entitled "learning system design using Knowledge Management System to improve the competency of early childhood Education Teachers" this research produces a knowledge management based learning system using the RAD (Rapid Application Development) model to analyze and design the system. Based on the description above, to solve teacher knowledge management problems, the author intends to create a "Knowledge Management System at IGTKI South Bangka Regency using the Strohmaier Framework".

II. METHODS

This study focuses on the formation of a knowledge architecture model based on Strohmaier's theory. This architecture model is formed based on the business processes that exist in the organization. Below is a picture of the stages of the research methodology.

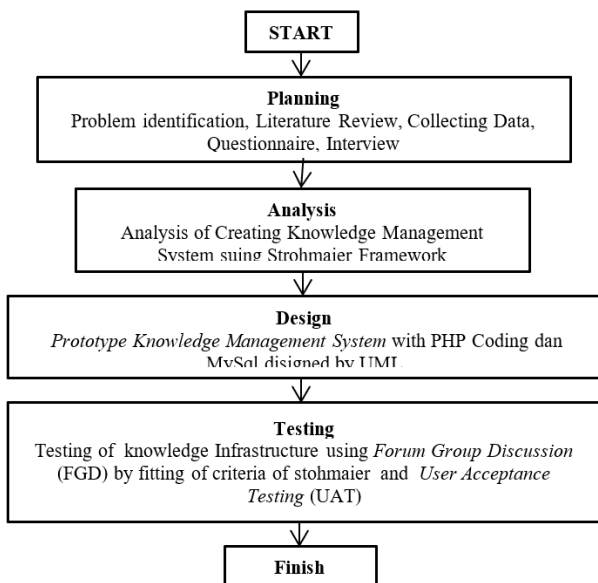


Figure 1. Methodology Research

1. Planning

The initial step taken at the planning stage was to identify problems by conducting interviews and questionnaires with PAUD teachers in South Bangka Regency as well as conducting literature studies in journals and books related to this research. The results obtained are an illustration of the problem formulation.

2. Analysis

At the analysis stage of this research using the Strohmaier Framework. The stages in this Framework are as follows:

- a. Business process modeling. At this stage, business processes are used to create working models of

organizational knowledge obtained from interviews. Structural modeling is illustrated using diagrams in UML.

- b. Identify the relationship between business processes and knowledge. At this stage, several knowledge domains and organizational roles involved in the business process can be identified. In the knowledge identification process, the four processes used are knowledge creation, knowledge application, knowledge transfer and knowledge storage.
- c. The development of infrastructure design knowledge is based on a knowledge process and consists of two elements.

1) *The architectural knowledge infrastructure template is a system architecture that describes the basic layer of a knowledge management system technology solution*

2) *Design process to help design the knowledge infrastructure that supports the organization's knowledge business processes. In this design process, the knowledge infrastructure designer helps in integrating and identifying (knowledge) requirements into infrastructure design knowledge. This stage focuses on the process approach to design. This design process uses the knowledge infrastructure process design framework from Strohmaier.*

3. Design

The system design technique used in the knowledge management system uses UML (Unified Manipulation Language) with PHP and MySql coding to create a Knowledge Management System Prototype.

4. Testing

The testing stage in this research was divided into two, namely:

- a. User acceptance testing of the system uses the User Acceptance Test (UAT) method with Linkert scale calculations.
- b. Testing the suitability of Knowledge Infrastructure Design with business processes is based on the Strohmaier Fit Criteria using the Forum Group Discussion (FGD) method. In this phase, it can be determined whether the design that has been created is suitable or not. The fit criteria were designed based on Strohmaier's KMS theory. The indicators used in this test are appropriate or not according to the Guttman scale calculation. The summary of fit criteria is as follows:

1. *Organizational roles must be able to access the knowledge they need.*

2. *The role of the organization must be able to provide / fill knowledge in the Knowledge Infrastructure.*

3. *Knowledge storage must be supported and managed by Knowledge Infrastructure.*

4. *Knowledge Infrastructure must handle knowledge transfer smoothly.*

5. *Knowledge Infrastructure must be able to facilitate knowledge collaboration between knowledge workers.*

6. *The collaboration model must also facilitate the need for collaboration anytime and anywhere (not limited to the workplace only).*

The FGD will begin with a focused discussion, the researcher will make a presentation and demo the KMS website that has been developed and explain each existing function based on the instruments that have been prepared. After paying attention and knowing how to operate this KMS website, the participants who attend will be given the opportunity to try this website directly. Next, the FGD participants provided information and responses via the form provided by the researcher before the respondents tried it on their respective PCs. Validation testing form with FGD is included in the attachment. In the FGD testing process, participants will be asked to provide responses in accordance with the hypothesis in this research.

Identification Of Business Processes and Knowledge

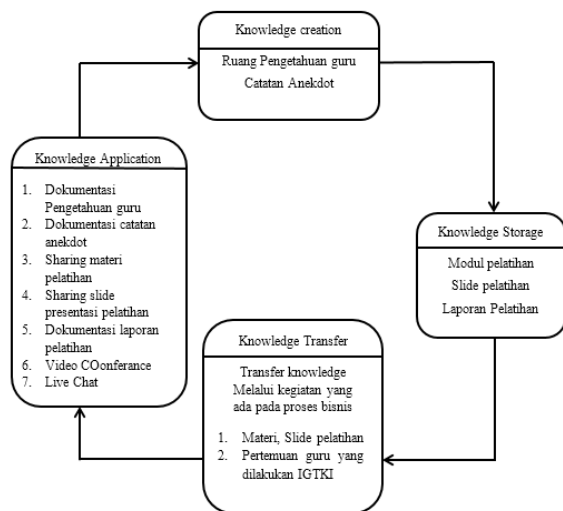


Figure 2. Design of Knowledge Process

This stage is the identification of knowledge

Domains and organizational roles involved in the business process. In the knowledge identification process, the four processes used are knowledge creation, knowledge application, knowledge transfer and knowledge storage. From this knowledge process, the fit criteria will be designed as a goal of knowledge infrastructure design. The fit criteria will be designed based on several KMS theories (Strohmaier, 2005) (Alvi, 2001). The summary of the fit criteria is as follows:

1. The role of the organization must be able to access the knowledge they need.
2. The role of the organization must be able to provide or fill the knowledge Knowledge infrastructure
3. Knowledge must be stored, supported and managed by the knowledge infrastructure.
4. Knowledge infrastructure must handle knowledge transfer. Knowledge infrastructure must be able to facilitate between knowledge and knowledge workers.
5. Collaboration must also facilitate the need for collaboration

anytime and anywhere that is not limited to the office.

Design of Infrastructure Design based on fit criteria strohmaier

Table 1 Design of Infrastructure Design based on fit criteria strohmaier

Fit Criteria	Process Knowledge	IT Tools
The role of the organization must be able to provide or fill knowledge in Knowledge infrastructure	Knowledge Creation	Teacher's Knowledge Space, Anecdotal notes
The knowledge stored must be supported and managed by Knowledge infrastructure	Knowledge storage and Retrieval	Training materials, training slides, training reports
Knowledge must be transferable by Knowledge infrastructure	Knowledge transfer	Video Conference, Live Chat, Teacher's Knowledge Space

Knowledge Infrastructure Design

For the design of the system based on the flow of teacher knowledge business process design, there are two strategies related to how individuals (teachers) acquire and share the knowledge needed to perform their duties as teachers. This strategy will affect the design of the knowledge infrastructure. The strategies are as follows: Codification strategy: This strategy focuses on collecting, codifying and disseminating information (explicit). This strategy will be highly dependent on IT. One of the advantages is the reuse of existing knowledge.

The codification strategy in the IGTKI Kab. Bangka Selatan teacher business process can be seen in the table below. Personalization strategy: This strategy focuses on developing networks to connect teachers so that tacit knowledge can be shared. This strategy emphasizes dialogue between individuals. Personalization of teacher business processes can be seen in the table below.

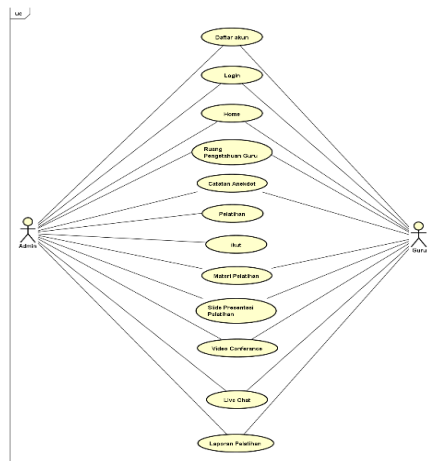


Figure 3. Usecase diagram of KMS IGTK

The image above is a description of what menus can be accessed by admins and teachers on the Knowledge Management System of IGTKI South Bangka Regency. Admin can use all menus according to their functions. Meanwhile, teachers cannot input training menus and participate.

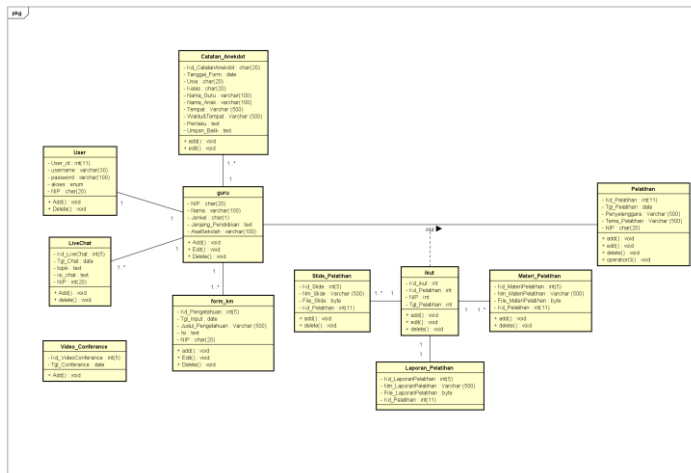


Figure 4. Class Diagram of KMS IGTKI

The Class Diagram above shows the classes of IGTKI teachers in South Bangka Regency and the system admin who is a user in this system who has relationships with several classes related to all knowledge stored in Knowledge Storage.

III. RESULT AND DISCUSSION

Based on the design of the Knowledge Infrastructure that has been made, testing is carried out. Testing uses Fit Criteria Validation to validate the design of the knowledge infrastructure that has been designed in the Forum Group Discussion (FGD). For user acceptance, the User Acceptance Test (UAT) questionnaire method is used for testing.

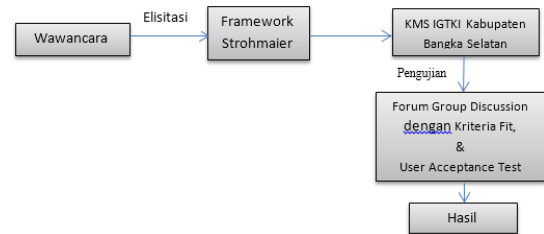


Figure 5. Testing

a. User Acceptance Test

User Acceptance Test is conducted using a questionnaire calculated based on the linkert scale. The weighting of the linkert scale is as follows. The respondents in this questionnaire were 7 respondents, which were then analyzed from each number to obtain an average scores

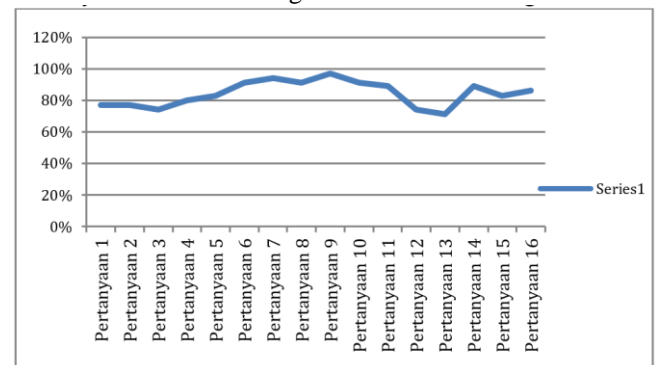


Figure 6. Questions Graph

Figure 5 is a graph of the percentage of each question that has been filled in by respondents in the User Acceptance Test questionnaire. The highest value is in question number 9. The results obtained from the calculations that have been carried out based on the linkert scale are 84%.

b. UAT Validity and Reliability Test

UAT questionnaire data was processed using SPSS to see the validity and reliability results. Table 4.12 provides information on the number of samples (n) of 7 respondents and produces a valid value of 100%.

Table I. Result of "Case Processing Summary" UAT

	N	%
Case Valid	7	100.0
Exclude d ^a	0	0
TOTAL	7	100.0

Listwise deletion based on all variables in the procedur Table 4 describes the results of item-total statistics for UAT regarding the validity of questions in the UAT questionnaire with a total of 7 respondents, so the df value = 7-2 = 5.

Table II. Result of "Reliability Statistics"

Reliability Statistics	
Cronbach's Alpha	N of Items
.976	8

Table 2 is the result of the reliability test after conducting three validity tests. The final result of the Cronbach's Alpha value of this reliability test is 0.976. With a Cronbach's Alpha value of $0.976 > 0.60$, it can be concluded that the questionnaire items as a whole are reliable.

c. Focus Group Discussion (FGD)

Implementation of a Forum Group Discussion (FGD) aims to focus testing on functional requirements. Considering the long distance between sub-districts, 7 people were collected. The FGD was validated using the strohmaier fit criteria to carry out the suitability assessed based on the guttman scale calculation. The weighting of the guttman scale is as follows:

Table III. Guttman Scale

Answer	Score
Sesuai	1
Tidak Sesuai	0

Based on the results of the Guttman scale calculation for the assessment of the suitability of the system with the business process, the value obtained is in the good/adequate category based on the score interpretation

IV. CONCLUSION

The conclusion of the test results obtained in this study is based on the validation of the fit criteria, the knowledge infrastructure designed in accordance with the integrity of the knowledge process based on Strohmaier's theories calculated based on the Guttman scale with a result of 76%. The results of the User Acceptance Test show that the Knowledge Management System at the Kindergarten Teachers Association (IGTKI) of South Bangka Regency is functionally acceptable to users with a weight of 84%, this application can function to provide solutions for IGTKI Teachers of South Bangka Regency and can be accepted by teachers. The results of the two tests according to the interpretation of the score are in the good / feasible category. Based on the two tests, it proves that:

- With the IGTKI Knowledge Management System of South Bangka Regency, teachers can share materials and results from training obtained from training institutions
- With the Teacher Knowledge Room and video conferencing features, the IGTKI South Bangka Regency Knowledge Management System, teachers can share knowledge about the behavior of students with special needs, as well as knowledge gained from teaching experience.
- With the upload file feature on the IGTKI Knowledge Management System of South Bangka Regency, it can improve and make it easier for teachers to document training reports

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